Z_1, Z_2, Z_3, Z_4, and Z_5 while changing a measurement mode of the impedance measurer **120**.

[0188] In operation **1220**, the mode controller **130** may switch the impedance measurer **120** to the first mode as illustrated in FIG. **15**. Also, the impedance measurer **120** may measure the first impedance value Z_1 under the first mode. The impedance measurer **120** may measure the first impedance value Z_1 by measuring a voltage by using the voltmeter **124**.

[0189] In operation **1230**, the mode controller **130** may switch the impedance measurer **120** to the second mode as illustrated in FIG. **16**. Also, the impedance measurer **120** may measure the second impedance value Z_2 while operating according to the second mode. According to the second mode, a 3-point measurement may be performed with the first electrode **110***a* not being used for impedance measurement.

[0190] In operation **1240**, the mode controller **130** may switch the impedance measurer **120** to the third mode as illustrated in FIG. **17**. Also, the impedance measurer **120** may measure the third impedance value Z_3 according to the third mode. According to the third mode, a 3-point measurement may be performed with the second electrode **110***b* not being used for impedance measurement.

[0191] In operation **1250**, the mode controller **130** may switch the impedance measurer **120** to the fourth mode as illustrated in FIG. **18**. Also, the impedance measurer **120** may measure the fourth impedance value Z_4 according to the fourth mode. According to the fourth mode, a 3-point measurement may be performed with the third electrode **110***c* not being used for impedance measurement.

[0192] In operation **1260**, the mode controller **130** may switch the impedance measurer **120** to the fifth mode as illustrated in FIG. **19**. Also, the impedance measurer **120** may measure the fifth impedance value Z_5 according to the fifth mode. According to the fifth mode, a 3-point measurement may be performed with the fourth electrode **110***d* not being used for impedance measurement.

[0193] In operation **1270**, the bio impedance obtainer **140** may obtain the bio impedance Zm from the first to fifth impedance values Z_1, Z_2, Z_3, Z_4, and Z_5 and the internal impedance Zs of the current source **122**. The bio impedance obtainer **140** may calculate Zc**1**, Zc**2**, Zc**3**, Zc**4**, and Zm by simultaneously solving Equations 10 to 14, and even when values of Zc**1**, Zc**2**, Zc**3**, and Zc**4** are not known or not calculated, the bio impedance obtainer **140** may calculate Zm. Also, the bio impedance obtainer **140** may output the bio impedance value Zm by using a lookup table instead of directly calculating the bio impedance value Zm.

[0194] FIG. **29** is a flowchart illustrating a method of measuring a bio signal according to an exemplary embodiment.

[0195] Referring to FIG. **29**, the impedance measurer **120** may measure not only a voltage between the electrodes **110***b* and **110***c* but also a current amount supplied to the electrode unit **110** under each mode. Also, the first and second impedance values Z_{4P} and Z_{2P} may be determined by taking into account not only a voltage Vm measured by the voltmeter **124** but also a current I_2 measured by the amperemeter **125** according to each mode.

[0196] Hereinafter, respective operations of FIG. **29** are described with reference to FIGS. **20** to **23**.

[0197] In operation **1310**, the electrodes are positioned to contact a surface of the examinee.

[0198] In operation **1320**, the mode controller **130** may switch the impedance measurer **120** to the first mode as illustrated in FIG. **20**.

[0199] In operation **1330**, the amperemeter **125** of the impedance measurer **120** may measure a current amount I_1 supplied to the electrode unit **110**. The amperemeter **125** may measure the current amount I_1, thereby reflecting a change of the current amount I_1 supplied to the electrode unit **110** due to the internal impedance Zs of the current source **122** while obtaining the bio impedance Zm.

[0200] In operation **1340**, the bio impedance obtainer **140** may determine the first impedance value Z_{4P} from a voltage Vm and the current I_1 measured according to the first mode. The bio impedance obtainer **140** may determine the first impedance value Z_{4P} by using the CPU **141** as illustrated in FIG. **22**. As illustrated in FIG. **23**, the bio impedance obtainer **140** may include the first impedance determiner **145***a* that determines the first impedance value Z_{4P}.

[0201] In operation **1350**, the mode controller **130** switches the impedance measurer **120** to the second mode as illustrated in FIG. **21**.

[0202] In operation **1360**, the amperemeter **125** of the impedance measurer **120** may measure a current amount I_1 supplied to the electrode unit **110**. The amperemeter **125** may measure the current amount I_1, thereby reflecting a change of the current amount I_1 supplied to the electrode unit **110** due to the internal impedance Zs of the current source **122** while obtaining the bio impedance Zm.

[0203] In operation **1370**, the bio impedance obtainer **140** may determine the second impedance value Z_{2P} from a voltage Vm and the current I_1 measured according to the second mode. The bio impedance obtainer **140** may determine the second impedance value Z_{2P} by using the CPU **141** as illustrated in FIG. **22**. As illustrated in FIG. **23**, the bio impedance obtainer **140** may include the second impedance determiner **145***b* that determines the second impedance value Z_{2P}.

[0204] In operation **1380**, the bio impedance obtainer **140** may obtain the bio impedance Zm from the first and second impedance values Z_{4P} and Z_{2P}. In this case, the bio impedance Zm may be obtained from a result obtained by simultaneously solving Equations 1 and 2. Since a current change by the internal impedance Zs of the current source **122** has already been taken into account in the process of determining the first and second impedance values Z_{4P} and Z_{2P}, the bio impedance obtainer **140** may obtain the bio impedance Zm even without using the internal impedance value Zs.

[0205] In the above description, the apparatus and method of measuring a bio signal according to the exemplary embodiments have been described with reference to FIGS. **1** to **29**.

[0206] The apparatus for measuring a bio signal according to the exemplary embodiments may measure the bio impedance regardless of contact impedance.

[0207] Also, the apparatus for measuring a bio signal according to the exemplary embodiments may measure the bio impedance by using an electrode having a small size.

[0208] Also, the apparatus for measuring a bio signal according to the exemplary embodiments may improve the accuracy of a bio impedance measurement value by taking into account the internal impedance of the current source.

[0209] The apparatus according to the present exemplary embodiments may include a processor, a memory for storing program data and executing the stored program data, a